

Lab 4 Specifications

Lab-specific Specifications

Proficiency

- Design plays *Für Elise* from provided starter code
- Note durations match the durations specified in the starter code for *Für Elise* (i.e., the tune plays at the correct tempo)
- Individual pitches are calculated to be accurate within 1% across the frequency range of 220-1000 Hz. (calculations should be provided in the report to verify this)
- All rests (pauses with no sound) are played properly
- Code uses `#define` macros for memory-mapped registers

Excellence

- Report contains accurate calculations for **minimum duration** supported
- Report contains accurate calculations for **maximum duration** supported
- Report contains accurate calculations for **minimum frequency** supported
- Report contains accurate calculations for **maximum frequency** supported
- Report provides documentation and calculations to show that the durations and pitches are correct based on the timer configuration.
- Design contains potentiometer to control the output volume.
- Design plays an extra composition of your choice. You need not compose the tune from scratch, it is acceptable to transpose an existing tune.

General Specifications

Schematic Specifications

Proficiency

- All pin names labeled
- All pin numbers labeled
- Crossing wires clearly identified as junction or unconnected
- Neat layout (e.g., clear organization and spacing)
- All parts labeled with part number
- All component values present

Excellence

- Standard symbols used for all components where applicable
- Signals “flow” from left to right where possible (e.g., inputs on left hand side, outputs on right hand side)
- Title block with author name, title, and date

Block Diagram (Required for labs 1, 2, 3 and 7)

Proficiency and Excellence

- Block diagram present with one block per SystemVerilog module
- Each block includes all input and output signals

HDL & Code Specifications

Proficiency

- Descriptive filename that matches module name (e.g., `lab2_jb.sv`)
- One module per file
- Descriptive variable names
- Neat formatting (e.g., standard indentation, consistent formatting for variable names (kebab-case/snake_case/camelCase/PascalCase))
- Descriptive and clear function/module names
- Comments to indicate the purpose of each function/module

Excellence

- Name, email, and date at the top of every file
- Comment at the top of each source code file to describe what is in it
- Clear and organized hierarchy (e.g., delineation between top level modules and submodules)
- Testbenches written for each individual module to demonstrate proper operation
- Testbench output for each module included in the report

Writeup/Summary

Proficiency and Excellence

- Statement of whether the design meets all the requirements. If not, list the shortcomings.
- Number of hours spent working on the lab are included.
- Writeup contains minimal spelling or grammar issues and any errors do not significantly detract from clarity of the writeup.
- AI prototype attempted and some reflection is recorded.
- (Optional) List comments or suggestions on what was particularly good about the assignment or what you think needs to change in future versions.

Comments

Add specific notes here about the assignment.